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10/627,725

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EXAMINER

CREPEAU, JONATHAN

ART UNIT

PAPER NUMBER

1795

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/627,725

**Applicant(s)**

KWEON ET AL.

**Examiner**

Jonathan S. Crepeau

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-20, 22-24 and 38-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-20, 22-24 and 38-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 10/31/07.
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 31, 2007 has been entered.

This Office action addresses claims 11-20, 22-24, 38-40, and newly added claim 41. Claims 11-20, 22-24, 38-40 remain rejected under 35 USC 103 for the reasons of record, and claim 41 is newly rejected under 35 USC 103. This action is non-final.

### ***Claim Rejections - 35 USC § 103***

2. Claims 11-20, 22-24, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 9-171813 in view of Maegawa et al (U.S. Patent 6,383,235).

JP '813 is directed to a rechargeable lithium battery comprising a lithiated positive electrode material. Regarding claim 12, the active material may comprise  $\text{LiCoO}_2$ ,  $\text{LiNiO}_2$ , or  $\text{Li}_x\text{Ni}_y\text{Co}_{1-y}\text{O}_2$  (see paragraph 24). The active material comprises a surface treatment layer on the lithiated core comprising a networked aluminum hydroxide/oxyhydroxide structure (see Figure 1). Regarding claim 18, in addition to aluminum, silicon or titanium may also be used

(see paragraph 20). Regarding claims 11, 38, 39, and 40, the active material is made by a process of dissolving aluminum hydroxide in aqueous solution, coating the active material, and drying the coated compound at 120 degrees C for 2 hours (see [0036]). Regarding claim 13, an alcohol may also be used as a solvent (see [0022]).

The reference does not expressly teach that the drying is conducted at a temperature of approximately 60-100 degrees, as recited in claims 11, 38, 39, and 40.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to manipulate the drying temperature of JP '813 so as to fall within the claimed range. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). In this case, the 120 degree temperature disclosed by the reference appears to be merely exemplary, and the artisan would be sufficiently skilled to reduce the drying temperature to affect the composition and crystal structure of the surface coating. As such, the claimed temperature range is not considered to distinguish over the reference.

Regarding claims 19 and 20, which recite the concentration of coating material source in the solution, paragraph [0036] of the reference appears to disclose a concentration of about 10 weight parts of aluminum hydroxide. Accordingly, this disclosure is sufficient to render obvious the claimed range of 0.1-50 wt% (5-30%) in aqueous or organic solution.

Regarding claims 14 and 16, which recite that the mixture is "refluxed" to form the solution of coating material source, this limitation is not considered to distinguish over the

reference. It would have been obvious to employ any means necessary to achieve good mixing and dissolution of the coating source material into the solvent. Accordingly, the step of “refluxing” the material would have been well within the skill of the art to employ to make the coating material solution.

Regarding claims 11, 38, 39, and 40, the drying step in JP ‘813 to evaporate the solvent can be characterized as “continuously increasing the temperature within the mixer.” However, the reference does not expressly teach that the lithiated compound and the solution are “injected” into the mixer as recited in the claims.

Maegawa et al is directed to a method of forming a cathode material by spray-drying. In the method, two solutions are mixed and then sprayed (injected) into a spray-dryer with a compressed air flow (see Example 1).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the spray-dryer of Maegawa et al. to perform the mixing and drying of the material of JP ‘813. Regarding the mixing of the materials of JP ‘813, it would be obvious to employ any method that would result in sufficient mixing of the lithiated compound and the coating solution. Maegawa et al. is evidence of this, and discloses in numerous locations that its process and apparatus provides for good mixing between the solutions. Therefore, a skilled artisan would be motivated to use a spray dryer as suggested by Maegawa et al. to mix the materials of JP ‘813. Furthermore, the use of a compressed air stream to introduce the solution as disclosed in Maegawa would render obvious the subject matter of claim 22.

Regarding the limitation in claim 40 that “the coating and drying of the lithiated compound is performed simultaneously,” it is submitted that the use of the spray-dryer of Maegawa would also render this limitation obvious. As disclosed in Maegawa, spray-drying involves removal of the solvent as the materials are mixed. Thus, a coating and drying function are performed simultaneously.

Regarding the limitation that the coating step is performed under vacuum as recited in claim 23, this step would also be well within the skill of the art to perform in the method of JP ‘813 as modified by Maegawa. By performing an evacuating step in the spray-dryer, the net air flow through the spray-dryer would be increased and drying time would be reduced. Accordingly, this modification would be obvious to a skilled artisan.

Regarding claim 24, the sieving of the dried compound would be an obvious step in preparing the compound for use in a battery electrode.

3. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 9-171813 in view of Maegawa et al. as applied to claims 11-20, 22-24, and 38-40 above, and further in view of Shindo et al (U.S. Patent 6,045,947).

JP ‘813 does not expressly teach that the average particle diameter of the lithiated compound is 10 microns, as recited in claim 41.

Shindo et al. is directed to an electrode plate for a secondary battery. In Example 1 the reference discloses that an  $\text{LiCoO}_2$  material having an average particle diameter of 10 microns is used as the active material.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. In this case, the use of an  $\text{LiCoO}_2$  material having an average particle diameter of 10 microns as suggested by Shindo et al. in the electrode of JP '813 would have yielded predictable results and would have therefore been obvious.

#### ***Double Patenting***

4. Claims 11-20, 22-24, and 38-40 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of U.S. Patent Nos. 6753111, 6797435, and 6846592 in view of Maegawa. Although the conflicting claims are not identical, they are not patentably distinct from each other because Maegawa renders obvious the mixing, coating and drying steps as set forth in the above rejection.

5. Claim 41 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of U.S. Patent Nos. 6797435 and 6846592 in view of Maegawa as applied above and further in view of Shindo et al. Although the conflicting claims are not identical, they are not patentably distinct from each other because Shindo renders obvious the claimed average diameter of 10 microns as set forth in the 35 USC 103 rejection above.

6. Claims 11-20, 22-24, and 38-40 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of copending Application No. 10/944892. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '892 application render obvious the instant claims (i.e., the instantly claimed temperature range).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

7. Claim 41 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of copending Application No. 10/944892 in view of Maegawa as applied above and further in view of Shindo et al. Although the conflicting claims are not identical, they are not patentably distinct from each other because



Shindo renders obvious the claimed average diameter of 10 microns as set forth in the 35 USC 103 rejection above.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Response to Arguments***

8. Applicant's arguments filed October 31, 2007 have been fully considered but they are not persuasive. Applicants state that JP '813 provides no motivation for drying the compound at the claimed temperature of approximately 60 to 100 degrees C. First, it is asserted that a finding of obviousness does not necessarily require the articulation of a specific teaching, suggestion, or motivation. See *KSR v. Teleflex*, 82 USPQ2d 1385, 127 S. Ct. 1727 (2007). Additionally, the court in *KSR* held that a claim would have been obvious because "a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If the leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense." In this case, the "known options" are the temperatures at which the material of JP '813 may be dried, of which there are a finite number of identified, predictable solutions. As such, selecting a temperature within 60-100 degrees would have been obvious to a skilled artisan.

Further, it is submitted that the artisan would also have motivation to reduce the drying temperature of 120 degrees disclosed by the reference. As stated above, the temperature disclosed in the reference appears to be merely exemplary and the artisan would be sufficiently

skilled to reduce the drying temperature to affect the composition and crystal structure of the surface coating. In addition, it is submitted that the artisan would be motivated to perform the drying step at a temperature as low as possible while still obtaining the desired results in order to save energy during the drying process. It is further noted that Applicant's statement that the reference teaches a drying temperature of "more than" 120 degrees is not accurate in light of the certified translation, now of record, which discloses the step of drying for 2 hours at 120 degrees (par. [0036]).

Furthermore, the reference's disclosure of a drying temperature of 120 degrees is also not believed to "teach away" from the claimed invention. The reference's teaching occurs in an example, and there does not appear to be any other disclosure or guidance regarding the temperature range. Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971); MPEP 2123.

Regarding Maegawa, Applicants state that "[a]s noted by MPEP 2143.01, an unsubstantiated statement that existing elements could be combined as it was in the skill of the art to do so does not provide a basis for a rejection under 35 USC 103(a)." In response, it is believed that the motivation to combine the references (i.e., good mixing) has been sufficiently addressed in the rejection. In addition, as stated above, it has been held that a finding of obviousness does not necessarily require the articulation of a specific teaching, suggestion, or motivation. In this case, the claims would have been obvious, even in the absence of a specific motivation, because a particular known technique (spray-drying) was recognized as part of the

ordinary capabilities of one skilled in the art. The skilled artisan would have recognized that applying the spray-drying technique of Maegawa would have yielded predictable results in the process of JP '813. As such, the combination of references is believed to be proper.

Furthermore, although it is acknowledged that the temperature range disclosed by Maegawa is higher than the claimed range, Maegawa is not relied upon to teach the claimed temperature range. Additionally, as previously noted on the record, the drying step in Maegawa occurs during mixing to form a precursor, which is then sintered. When combining the references, a skilled artisan would not be motivated to perform the sintering step, as this would result in excessive heat-treatment (i.e., oxidation) of the material and alteration of its chemical structure.

### *Conclusion*

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau  
Primary Examiner  
Art Unit 1795  
December 20, 2007